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Chapter 12 - Comparative Summaries of the Route Sectors

Oliver Sector

The following is a summary and comparison of the impacts of the three route alternatives in the Oliver Sector of the Arrowhead-Weston project. It shows the variation in impacts between the routes. In addition to comparing the data for various factors there will be a discussion of aesthetic impacts, where appropriate. Construction of this line could change the aesthetics of the places where people live, work, and recreate. A discussion of aesthetics cannot reflect the aesthetic impact on every individual who may be affected by the proposed line, but it attempts to recognize the types of impacts experienced by a majority of individuals.

Table 12-1 compares the three route alternatives in the Oliver sector. More details about the potential impacts on each route are found in Chapter 7.

General

All three routes are about the same length; Oliver 2 is slightly longer. Oliver 1 was designed to maximize corridor sharing except in the area of the LCO Reservation. As a result it makes more use of existing corridors (transmission line, pipeline, railroad, and road) than Oliver 2. The Oliver 3 Route has even more corridor sharing than Oliver 1 since it follows an existing transmission line through the LCO reservation. The Oliver 3 Route may not be a viable option if the reservation government would not allow a line on reservation land.

The Oliver 1 Route could further increase its use of existing corridors by substituting segments 339, 332cx, 332ax, 330, 329, 326, and 325 (all segments on Oliver 2) for segments 337c, 337a, 334a, 328, 324c, and 324b. In addition, segment 314, which is currently an unused segment, could be substituted for segment 315. The substitution of these segments could also provide other environmental advantages. It would decrease the amount of agricultural land affected substantially (20 acres vs. 73 acres) and the amount of forest land affected (11 acres vs. 186 acres). Other types of environmental impacts, such as the length of agricultural and forest land crossed and the amount of wetlands affected, would not change substantially. Using these replacement segments, the Oliver 1 Route would avoid impacts on the Benson Creek Fishery

Area but would affect Summit Lake instead. It would avoid the wetlands and springs at Benson Creek but would affect the wetlands at Hauer and Alder Creek.

Table 12-1 Oliver Route comparisons table

		Oliver 1	Oliver 2	Oliver 3
General				
Total length (miles)		93.5	99.2	91.5
No existing infrastructure (miles)		18.2	47.5	6.0
Existing transmission line (miles)		56.9	17.0	78.9
New ROW (acres)	Double circuit	655	1404	304
	Parallel construction	1264	1518	NA
Natural Resources				
Lakes within 1000 feet		7	10	12
River/stream crossings, no existing transmission line		20	61	2
River/stream crossings that are inaccessible *		10	40	10
Outstanding/Exceptional Resource Water crossings		8	11	4
Wetland (non-forested), total crossed (miles)		11.8	7.4	13.8
Wetland (non-forested) no existing infrastructure (miles)		0.9	3.0	1.0
Sensitive wetlands (miles)		1.7	0.7	1.7
Wetlands greater than 800 feet wide		19	26	23
Wetland areas that are inaccessible		2	11	4
Forest**, total land crossed (miles)		46	64.5	40.2
Forest* land crossed, no existing infrastructure (miles)		11.5	49.2	3.5
Upland forest cleared (acres)	Double circuit	386.5	863.5	108.5
	Parallel construction	629.5	915.5	NA
Wetland forest cleared (acres)	Double circuit	30.5	132.5	22.5
	Parallel construction	91.5	138	NA
Social and Economic				
Public land crossed (miles)		36	23	31
Recreation trails (no existing transmission line)		2	4	1
Lac Courte Oreielles Res. Land cleared (acres)		0	0	10.4
Homes 0-150 feet	Double circuit	8	13	16
	Parallel construction	10	13	NA
Homes 150-300 feet	Double circuit	36	40	47
	Parallel construction	30	39	NA
Agricultural land, total crossed (miles)		20.7	14.9	24.8
Agricultural land crossed, no existing transmission line (miles)		7.4	9.1	2.6
Historical/Archeological sites		10	4	13

*See discussion of inaccessibility in Chapter 7.
**Forest includes upland and wetland forest.

Natural resources

Lakes: Oliver 3 has 12 lakes within 1,000 feet of the proposed line, Oliver 2 has 10, and Oliver 1 has 7. Not all lakes within 1,000 feet would be environmentally or aesthetically affected by construction of this line. For some lakes the impact would only be incremental since there is an existing line already along the corridor. Affect on aesthetics would also depend on how much

land around the lake is already cleared and developed. The aesthetics of remote undeveloped lakes, where the line is more than 300 feet away, would probably not be affected, since the people who recreate there probably will not be aware of its presence. A line near a developed lake would be closer to more people but would be less incongruous than one close to an undeveloped lake. There are several developed lakes with large cleared areas on Oliver 2 and 3 Routes where a new higher voltage transmission line would become more visible, but there is an existing transmission line corridor, so the impact would be incremental. Summit Lake on Oliver 2 Route would be the most directly affected since it currently has a relatively undeveloped shoreline and the line would pass very near or over the shore of the lake.

Rivers and streams: The Oliver 2 Route has 71 river crossings, almost twice as many as the other two routes. On all of the routes there are many river and stream crossings proposed where no transmission line crossing exists now. River and stream crossings at these locations would have the greatest potential for degradation of habitat and impact on wildlife. River and stream users would also be most aesthetically affected at these locations. There are 61 such crossings on Oliver 2 Route, 20 on Oliver 1 Route, and two on Oliver 3 Route. The Oliver 1 and 3 Routes have the best river crossing options for the major rivers, from an aesthetic perspective, since all crossings are at existing transmission line corridors.

Crossing at inaccessible locations is the other area of greatest concern for rivers and streams. This becomes compounded when there are wetlands associated with the stream. Oliver 2 Route has 40 inaccessible river or stream crossings, far outnumbering the Oliver 1 and 3 Routes. Oliver 2 Route also has more crossings of OERW. It may be more difficult to obtain permits to cross OERW streams, especially at new crossings.

Forests and wetlands: People own plots of forest and wetland for many different reasons. Most of those reasons would be affected by construction of a high voltage transmission line in one way or another. Use and enjoyment for purposes of primary residence, vacation residence, or as an undeveloped retreat that preserves forest habitat would be greatly affected, both environmentally and aesthetically. Ownership for purposes of selling timber, selling land for profit, or harvesting wood for fuel or building projects would be affected environmentally and economically. If there were an existing corridor at the location the impact would be incremental.

There is a substantial difference between the routes in the total acreage of (new and existing corridors) forest and wetland affected. Oliver 2 Route would affect many more acres of forest and wetland, regardless of whether it is double circuit with another line or constructed parallel to another line. Forests and wetlands with no existing corridors would be the most environmentally and aesthetically affected if the line were constructed on the Oliver 2 Route. The Oliver 2 Route, at 52 miles, has more than four times as many miles through forests and wetlands on new corridors as Oliver 1 Route (12.5 miles). Oliver 3 Route has the least miles, at 4.5.

Oliver 2 Route has the greatest potential to cause forest fragmentation. The proposed route would fragment eight large (over 1,000 acres) forest blocks with new corridors at least 120 feet

wide. Oliver 1 Route would fragment three (one partially) large blocks of forest with new corridors. Oliver 3 Route would not require any new corridors through large forest blocks.

Wildlife: Oliver 2 Route has the greatest potential for impact on timber wolves. A section of the proposed corridor would cross through the heart of the Moose Lake wolf pack territory with the potential for fragmenting an established territory. Oliver 1 and 3 Routes could also affect wolf territories, but incrementally, on existing corridors.

Socioeconomic impacts

Public lands: All three Oliver routes would affect public land as well as private land. Oliver 1 crosses 36 miles of public land, the highest percentage (39 percent). Oliver 3 Route crosses 31 miles (34 percent) of public land. The use of public land avoids the use of private land and the controversy around condemnation of private land, but raises other issues. Often public land is developed or managed for habitat protection, or for the aesthetic enjoyment of all members of the public. Use of public land for a transmission line could affect the use and enjoyment of more people than use of private land. This would be most critical where construction of the line would disrupt the developed or pristine aspects of these properties. The Oliver 2 Route interferes more with management plans for public land, including county, state, and federal lands.

Trails: On developed trails where some infrastructure exists at the proposed crossing there would be a range of aesthetic impacts; less from use of existing transmission line corridors, more from use of existing railroad corridors, and the most from use of pipeline corridors. Trail users participating in non-motorized sports (canoeing, hiking, hunting on foot, and cross-country skiing) may be the most affected by visible changes since they would likely be more aware of their surroundings. Faster moving sports that require more concentration on the trail than on the surroundings to avoid accidents, would be less likely affected by visible changes to the trail surroundings. Oliver 1 Route has two (three, if revised segment 324 is used) trails that would be crossed where there is no existing transmission line. Oliver 2 Route has four trails and Oliver 3 Route has one.

Proximity of homes and businesses: The effects on places where people work (farms, commercial, and industrial properties) are similar for all three routes. The number of existing commercial, industrial, and farm buildings within 300 feet of the proposed line is almost identical for each route.

The number of homes within 50 feet of the proposed centerline is very small (one) for all three routes. The total number of homes within 300 feet is 44 for Oliver 1 Route, 52 for Oliver 2 Route, and 63 for Oliver 3 Route. The level of aesthetic effect on homes would depend on the current level of development, local topography, adjacent vegetative cover, and presence of other infrastructure corridors.

Reservation land: The Oliver 3 Route would have the greatest environmental and aesthetic effect on the LCO Reservation. Over 10 acres of reservation land, primarily forest with some

wetland, would have to be cleared. The Oliver 2 Route would parallel the edge of the reservation for several miles.

Agriculture: The amount of agricultural land crossed is very similar for all the routes. The Oliver 3 Route has the least miles of agricultural land where there is no existing transmission line.

Historical/archeological: The Oliver 2 Route has the fewest historical and archeological sites, but the site of greatest concern, The Historic Portage Trail would be aesthetically affected most by this route. The Oliver 2 Route would cross the Trail where no existing infrastructure is present. The line would require clearing at least 120 feet of ROW and erecting poles and wires. Mitigation agreements are in place for preservation of all other historical and archeological sites.

The most critical resource and access issues for the Oliver sector

The discussion of each route in Chapter 7 identified problem areas that would be encountered if that route were chosen. The following list is an attempt to identify the areas of particular environmental concern or that have the potential to complicate the permitting or construction process. Several agencies must grant permits before a line could be constructed on any of these routes. If permits are not granted because of a serious environmental or planning conflict, construction could be delayed or stopped. This list compares critical issues between routes to determine route viability/buildability.

Oliver 1 Route

Six critical resource and access issues:

- Inaccessible (by public road) wetland area south of Superior near Bear Creek, in an area characterized by DNR as high quality wetland with potential for special status. (Segments 392 and 385.)
- Two significant bird areas identified by the Nature Conservancy. These areas support mating pairs of rare game and non-game birds and are considered important to their survival. (Segment 372 and 367.)
- Access to a branch of Chippanazie Creek (designated as a Class 1 trout stream) that is within the Lost Lake area and its associated wetlands. This area is cooperatively protected by Washburn County and the DNR. (Segment 357.)
- The crossing of the Totogatic River, designated a Wild and Scenic River by Washburn County, listed on the NRI, and a resource conservation area with potential for old growth forest. There are also associated muskeg wetlands. This crossing is on an existing corridor but there are surrounding wetlands. (Segment 359.)

- Negotiation of a Namekagon River crossing, including some wetlands, with all the involved local, state, and federal agencies. (Segments 346 and 347.)
- Benson Creek State Fishery Area –Benson Creek (OERW and Class 1 trout steam) and associated wetlands in a wild and scenic area with no existing infrastructure. The DNR Management Plan includes elements of preservation. (Segment 324b.) The applicants have developed an alternative (segment 324a) that would avoid the Benson Creek Fishery Area.

Oliver 2 Route

Seventeen critical resource and access issues:

- Access to the Nemadji River, Balsam Creek, and the Black River crossings in a wild undeveloped area. (Segment 384.)
- Potential interference with a federal FSA Debt Cancellation Conservation Contract with a non-development clause. (Segment 373b.)
- Special design of the ROW to accommodate wolf crossing areas along the 17 miles of USH 53. (Segments 399 and 398.)
- One significant bird area identified by the Nature Conservancy. This area supports mating pairs of rare game and non-game birds and is considered important to their survival. (Segment 368 and 365.)
- Two affected lakes, St. Croix and Sand, are designated ORW. (Segments 368 and 332.)
- Access to the undeveloped St. Croix River crossing and the associated wetlands, which is also very near St. Croix Lake. (Segment 368.)
- An undeveloped crossing of the proposed national North Country Trail and Historic Portage Trail. (Segment 368.)
- Access to development of a new Leo Creek crossing. (Segment 368.)
- Crossing the Eau Claire River in an undeveloped area. (Segment 363.)
- The proposed crossing of the Totogatic River, at an undeveloped crossing, is in direct conflict with Washburn County Forest and Washburn County management objectives. The Totogatic River is a Wild and Scenic River in Washburn County and a resource conservation area with potential for old growth forest. (Segment 356.)
- New corridor through the heart of the Moose Lake wolf pack territory could fragment an established territory, affect current and future den sites, and affect the wolves' ability to hunt for food. (Segment 356.)
- Impact on Washburn County Forest units 7 and 9. Resources in both these units have been designated for special protection. In unit 7, the developed recreational

uses are protected, and in unit 9 the undeveloped character is protected as part of the deeding agreement. (Segments 356 and 357.)

- Negotiation of a Namekagon River Crossing with all the involved local, state, and federal agencies. (Segments 346.)
- Four smaller streams, all new crossings, are designated OERWs and are inaccessible without crossing the stream (Chippanazie Creek, Alder Creek, Hauer Creek, and Little Weirgor Creek). All also have inaccessible wetlands. (Segments 355, 326, and 321.)
- Impact on Summit Lake and Summit Lake Road. (Segment 326.)
- Hauer Springs wetlands, new corridor in a very wild and undeveloped area. (Segment 329.)
- Many other inaccessible wetland areas.
- Very great potential for forest fragmentation, especially in Washburn and Sawyer Counties.

Oliver 3 Route

Six critical resource and access issues:

- Inaccessible (by public road) wetland area south of Superior near Bear Creek, in an area characterized by DNR as high quality wetland with potential for special status. (Segments 392 and 385.)
- Two significant bird areas identified by the Nature Conservancy. These areas support mating pairs of rare game and non-game birds and are considered important to their survival. (Segments 372 and 367.)
- Access to Chippanazie Creek (designated Class 1 trout stream) within the Lost Lake area and its associated wetlands. This area is cooperatively protected by Washburn County and the DNR. (Segment 357.)
- The Totogatic River, a designated Wild and Scenic River, by Washburn County, listed on the NRI, and a resource conservation area with potential for old growth forest. There are also associated muskeg wetlands. (Segment 359.)
- Negotiation of a Namekagon River crossing with all the involved local, state, and federal agencies, including some wetlands. (Segment 346.)
- Negotiation of an agreement with the LCO tribe to cross its property on an existing transmission line corridor. Four inaccessible wetlands and two inaccessible streams would be affected. (Segment 320.)

Tripoli Sector

Table 12-2 compares the four routes in the Tripoli sector. More details about the potential impacts on each route are found in Chapter 8.

Table 12-2 Tripoli Route comparisons table

	Tripoli 1	Tripoli 2	Tripoli 3	Tripoli 4
General				
Total length (miles)	130.9	137.6	132.4	132.2
No existing infrastructure (miles)	111.7	123.9	91.3	91.5
Existing transmission line (miles)	10.4	8.4	36.4	37.8
New ROW (acres) Double circuit	2,062	2,202	1,799	1,779
Natural Resources				
River/stream crossings, no existing transmission line	56	52	42	38
River/stream crossings that are inaccessible *	48	47	47	47
Outstanding/Exceptional Resource Water crossings	11	3	9	3
Wetland (non-forested), total crossed (miles)	12.3	12.9	12.4	12.0
Wetland (non-forested), no existing infrastructure (miles)	11.2	11.0	8.0	7.6
Wetlands greater than 1,000 feet	34	35	29	29
Wetland areas that are inaccessible *	150	186	171	171
Forest ** total land crossed (miles)	85.5	80.2	73.4	73.0
Forest ** land crossed, no existing infrastructure (miles)	72.4	72.8	50.3	49.9
Upland forest cleared (acres) Double circuit	1,118	1,085	858	846
Wetland forest cleared (acres) Double circuit	231	198	140	142
Social and Economic				
Public land crossed (miles)	18.4	14.5	9.8	9.8
Total agricultural land crossed (miles)	26.9	38.9	40.9	41.5
New agricultural land crossed (miles)**	24.6	37.3	30.6	30.7
Homes 0-150 feet Double circuit	14	19	26	26
Homes 150-300 feet Double circuit	19	17	37	39
Recreational trails (no existing transmission line)	3	3	3	3
Historical/archeological sites	1	1	1	1

*See discussion of inaccessibility in Chapter 8.
**Forest includes upland and wetland forest.

General comparisons

Of the three routes in the Tripoli sector, the Tripoli 2 Route is the longest, at 138 miles (this includes the 115 kV construction required to maintain the connection of a relocated NSPW 115 kV line to the existing 115 kV system). The Tripoli 2 Route is also the route with the most new corridor (124 miles). The Tripoli 3 Route does the most corridor sharing with existing

infrastructure (mostly existing transmission line ROW), but still requires new corridor for 69 percent of its length (91 miles).

Natural resources

River and streams: The Tripoli 1 Route has the most new river and stream crossings (56). The Tripoli 4 Route has the least new river and stream crossings (38). Each of the four routes also has about the same number of inaccessible crossings. The major difference between the routes is that the Tripoli 2 and Tripoli 4 Routes only cross three water bodies listed as OERW. The other two routes cross about 10 streams with this designation.

The Tripoli 1 Route has three times as many trout stream crossings (23) as the Tripoli 2 and Tripoli 4 Routes, which have the fewest crossings of the four routes. Segment 14b of the Tripoli 1 and Tripoli 3 Routes crosses Fourmile Creek, an ERW, six times within a two-mile distance. Segment 119 of the Tripoli 1 Route crosses Douglas Creek, a trout stream, four times within the same distance.

The Tripoli 2 Route crosses the Flambeau River within the Flambeau River State Forest (segment 155b). The forest along this stretch of river has been designated a wilderness area.

Forest and wetlands*:* The Tripoli 1 Route crosses the most forest land. About the same amount of forest land would be required for new ROW on both the Tripoli 1 and Tripoli 2 Routes (about 72 miles). The Tripoli 3 and Tripoli 4 Routes need less new corridor through the forest (50 miles) because they follow an existing transmission line to a greater extent than the other routes. Consequently, the Tripoli 3 and Tripoli 4 Routes require the least clearing of forest land (988 to 998 acres).

The most forest fragmentation would result if the transmission line is built on the Tripoli 1 Route. Forest fragmentation is less severe, but still a major concern for the Tripoli 2, Tripoli 3, and Tripoli 4 Routes.

Wetland impacts on the three Tripoli routes are roughly similar, except that more of the wetlands crossed on the Tripoli 3 and Tripoli 4 Routes are along existing transmission line corridors. The Tripoli 2 Route crosses the most wetlands (about 186) where access could be a problem. The Tripoli 1 and Tripoli 2 Routes cross a similar number of large wetlands (over 1,000 feet wide) and more than the Tripoli 3 and Tripoli 4 Routes.

Wildlife: The Tripoli 1 Route would penetrate the territory of a timber wolf pack in Lincoln County.

Socioeconomic impacts

Public lands: The Tripoli 3 and Tripoli 4 Routes cross the least amount of public lands (10 miles), while the Tripoli 1 Route crosses the most (18 miles). The majority of these public lands are county forests.

Trails: Each of the routes crosses the Ice Age NST and the Knox Creek Heritage Center Trail. All but the Tripoli 1 Route cross the Pine Line Recreational Trail at the same location. The Tripoli 2, Tripoli 3, and Tripoli 4 Routes cross the Ice Age NST at a location that is in a wilderness-like setting. The Tripoli 1 Route crossing of the Ice Age NST is adjacent to a road. All the routes cross the Knox Creek Heritage Center Trail where it is adjacent to a road. The Tripoli 1 Route's second crossing of the Trail is in a wooded area not adjacent to any road.

All four routes cross the Nine Mile Forest. The Tripoli 3 Route would require creation of a new corridor through a wooded area with several trails used for cross-country skiing, biking, and hiking. The other three routes follow existing corridors (pipeline and transmission line) in crossing the forest.

Proximity of homes: The Tripoli 3 and Tripoli 4 Routes come nearest the most homes (63 to 65 within 300 feet), but most of the homes that contribute to this higher number are already adjacent to an existing transmission line.

Agriculture: The Tripoli 1 Route crosses the least farmland (27 miles). The Tripoli 4 Route crosses the most farmland (42 miles), but about 26 percent of this distance already has a transmission line. Consequently, the Tripoli 2 Route crosses the most farmland on new corridor (37 miles).

Historic/archeological: None of the routes would seriously impact the only archeological site located along each route

Critical environmental concerns and permitting issues

The discussion of each route in Chapter 8 identified problem areas that would be encountered if that route were chosen. The following list is an attempt to identify the areas of particular environmental concern or where potential complications in permitting or construction are possible. In selecting a route, decision-makers will need to weigh the acceptability of these impacts for each route in comparison to the impacts of the alternative routes. Also, several agencies must grant permits before a line could be constructed on any of these routes. If permits are not granted because of a serious environmental or planning conflict, construction could be delayed or stopped.

Tripoli 1 Route

Ten critical resources and access issues:

- New crossings of the Chippewa, Thornapple, and North Fork Jump Rivers, which are on the NRI.
- Numerous new crossings of Douglas Creek, a trout stream, within a two-mile distance.
- Ice Age NST crossing.

- The lengthy crossing of a large, wilderness-like, forested area in Lincoln County. This area is the territory of the Averill Creek wolf pack. Forest fragmentation impacts would be considerable in this area.
- Many large forest blocks would be fragmented elsewhere.
- Numerous new crossings of Fourmile Creek within a two-mile stretch. Fourmile Creek is an ERW and trout stream.
- New crossings of three other ERW (Middle Fork Main, Squaw, and Grass Creeks).
- Rusk, Price, and Lincoln County Forest crossings.
- Access difficulties at numerous streams and wetlands.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Tripoli 2 Route

Ten critical resource and access issues:

- New crossing of Little Weirgor Creek, an ORW.
- New crossings of two ERW (Middle Fork Main Creek and Big Rib River).
- Chippewa River (NRI listed) crossing in an undeveloped area.
- New crossings of the Thornapple, North Fork Jump, and South Fork Jump Rivers, which are on the NRI.
- New Flambeau River (NRI listed) crossing in the Flambeau River State Forest. The forest on either side of the river has been designated a wilderness.
- Ice Age NST crossing in a wilderness-like area.
- Many large forest blocks would be fragmented.
- Rusk, Price, and Taylor County Forest crossings.
- Access difficulties at numerous streams and wetlands.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Tripoli 3 Route

Eleven critical resource and access issues:

- New crossing of Little Weirgor Creek, an ORW.
- New crossing of the Thornapple River, which is on the NRI.
- Ice Age NST crossing in a wilderness-like area.

- Nine Mile County Forest crossing in an area of trails, on an entirely new ROW.
- A concentration of homes located in close proximity to an existing NSPW 115 kV transmission line, that would be double circuited with the new 345 kV line.
- Many large forest blocks would be fragmented.
- Numerous new crossings of Fourmile Creek within a two-mile stretch. Fourmile Creek is an ERW and trout stream.
- New crossings of two other ERW (Middle Fork Main Creek and Big Rib River).
- Rusk, Price, and Taylor County Forest crossings.
- Access difficulties at numerous streams and wetlands.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Tripoli 4 Route

Eight critical resource and access issues:

- New crossings of the Chippewa and Thornapple Rivers, which are on the NRI.
- Ice Age NST crossing in a wilderness-like area.
- A concentration of homes located in close proximity to an existing NSP 115 kV transmission line, that would be double circuited with the new 345 kV line.
- Many large forest blocks would be fragmented.
- Rusk, Price, and Taylor County Forest crossings.
- Access difficulties at numerous streams and wetlands.
- New crossing of the Big Rib River, an ERW.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Owen Sector

Table 12-3 compares the four routes in the Owen sector. More details about the potential impacts of each individual route are found in Chapter 9.

General

Of the four routes in the Owen sector, the Owen 1 Route is the longest (125 miles). This route is about eight miles longer than the other three. The Owen 1 Route also would require the most new ROW (74 miles) that does not follow electric transmission lines, petroleum pipelines, railroads, or roads. The Owen 3 Route follows these infrastructure corridors (mostly existing

transmission line and pipeline) to the greatest extent, but it still requires new corridor for 36 percent of its length (43 miles). The Owen 1 Route, if built with some parallel construction, would require the most acres of new ROW (2,001). The Owen 3 Route, if built using double circuit construction wherever possible, would require the least amount of new ROW (1,544 acres).

Table 12-3 Owen Route comparison table

		Owen 1	Owen 2	Owen 3	Owen 4
General					
Total length (miles)		124.7	116.4	117.5	118.4
No existing infrastructure (miles)		73.6	58.5	42.8	44.1
Existing transmission line (miles)		31.6	15.4	37.5	38.1
New ROW (acres)	Double circuit	1,705	1,802	1,544	1,552
	Parallel construction	2,001	NA	1,737	1,745
Natural Resources					
River/stream crossings, no existing transmission line		38	34	28	22
River/stream crossings that are inaccessible*		35	28	24	21
Outstanding/Exceptional Resource Water crossings		8	2	8	2
Wetland (non-forested), total crossed (miles)		16.2	13.9	13.4	13.1
Wetland (non-forested) no existing infrastructure (miles.)		7.0	6.8	5.0	4.6
Wetlands greater than 1,000 feet wide		25	28	29	28
Wetlands* that are inaccessible		129	110	103	106
Forest, ** total land crossed (miles)		44.3	35.9	33.5	33.7
Forest, land crossed, no existing infrastructure (miles)		23.4	16.0	11.2	12.2
Upland forest cleared (acres)	Double circuit	484	443	373	369
	Parallel construction	580	NA	417	414
Wetland forest cleared (acres)	Double circuit	116	98	76	85
	Parallel construction	134	NA	87	96
Social and Economic					
Public land crossed (miles)		3.5	2.6	2.4	2.6
Historical/Archeological sites		1	2	2	2
Homes 0-150 feet	Double circuit	12	15	14	15
	Parallel construction	10	NA	14	15
Homes 150-300 feet	Double circuit	19	30	26	27
	Parallel construction	21	NA	26	27
Agricultural land, total crossed (miles)		57.4	58.1	62.9	64.0
Agricultural land crossed, no existing transmission-line (miles)		41.6	50.0	40.4	41.3
Recreation trails (no existing transmission line)		1	1	1	1

*See discussion of inaccessibility in Chapter 9.
**Forest includes upland and wetland forest.

Natural resources

River and streams: The Owen 1 Route has the most new river and stream crossings (38) and the most crossings with apparent access problems (35). The Owen 4 Route has the fewest new crossings (22) and crossings with access difficulties (21). Of the three routes, the Owen 2 and Owen 4 Routes have the fewest crossings of OERW (2), while the Owen 1 and Owen 3 Routes each have eight of these crossings.

The Owen 2 and Owen 4 Routes cross three trout streams. The other two routes cross trout streams 10 or 11 times each. Segment 14b of the Owen 1 and Owen 3 Routes crosses Fourmile Creek, an ERW, six times within a two-mile distance.

Forest and wetlands: The Owen 1 Route crosses the most forest land (44 miles), and would require the most new corridor through forests (23 miles). The Owen 3 and Owen 4 Routes have the least amount of new ROW in forest (12 miles) and would require the least amount of forest to be cleared (449 to 454 acres for double circuit). A new 345 kV line on the Owen 1 Route built parallel to adjacent lines would require the most forest clearing (714 acres).

Wetland impacts on the three Owen routes are quite similar. The greatest area of wetland affected would occur on the Owen 1 Route, although this route crosses slightly fewer large wetlands (wider than 1,000 feet) than the other three routes. It also appears that there are more wetlands that would be difficult to access on the Owen 1 Route (129), than on the other routes.

Wildlife: The edge of the Pershing Wildlife Area is crossed by the Owen 1 Route. The Owen 1 and Owen 2 Routes cross or lie near several prairie chicken booming grounds in northeastern Clark County. The Owen 3 and Owen 4 Routes pass just south of the Three Lakes Wetland Mitigation Site in Marathon County. At each of these locations the new transmission line would present a bird collision risk. An existing transmission line currently crosses the Three Lakes site. If the proposed line were built on the Owen 3 and Owen 4 Routes, the existing line would be moved off the site and be double circuited with the new line. This would reduce the overall bird collision hazard at the site.

Socioeconomic impacts

Public lands: The Owen 1 Route crosses somewhat more public land (3.5 miles) than the other three routes (about 2.5 miles).

All of the routes cross the Nine Mile Forest. The Owen 1 and Owen 3 Routes follow existing corridors (pipeline and transmission line) through the forest. Segment 8b of the Owen 2 and Owen 4 Routes skirts the southern edge of the forest on new ROW before joining and following an existing transmission line through the forest.

Trails: Each of the routes crosses a planned segment of the Ice Age NST in western Taylor County. The Owen 2, Owen 3, and Owen 4 Routes cross property owned by the Flambeau Mining Company that contains several trails and is open for public recreation. While crossing

the property, the routes also cross the Flambeau River at a scenic site used for fishing, wading, and picnicking. It may be possible to relocate this crossing slightly to reduce its visual impact. The Owen 2 Route crosses a Rustic Road in Clark County.

Proximity of homes : The Owen 2 Route has the most homes (45) within 300 feet of the centerline, while the Owen 1 Route is within 300 feet of only 31 homes.

Agriculture: The Owen 4 Route crosses the most farmland (64 miles), but for over 20 miles of this distance, the new line could be adjacent to or double circuited with an existing transmission line. The Owen 2 Route crosses the most farmland that is not presently affected by a pipeline or transmission line crossing. The Owen 1 and Owen 2 Routes cross similar amounts of farmland (57 to 58 miles).

Historical/archeological: There are two archeological sites along the Owen 2 and Owen 3 Routes and one along the Owen 1 Route. None of the routes would seriously impact these sites.

Critical environmental concerns and permitting issues

The discussion of each route in Chapter 9 identified problem areas that would be encountered if that route were chosen. The following list is an attempt to identify the areas of particular environmental concern or where potential complications in permitting or construction are possible. In selecting a route, decision-makers will need to weigh the acceptability of these impacts for each route in comparison to the impacts of the alternative routes. Also, several agencies must grant permits before a line can be constructed on any of these routes. If permits are not granted because of a serious environmental or planning conflict, construction could be delayed or stopped.

Owen 1

Seven critical resource and access issues:

- Pershing State Wildlife Area crossing.
- New crossing of Little Weirgor Creek, an ORW.
- New crossing of the Thornapple River, which is on the NRI.
- Numerous new crossings of Fourmile Creek within a two-mile stretch. Fourmile Creek is an ERW and trout stream.
- Access difficulties at numerous streams and wetlands.
- Crossing of the Nine Mile County Forest.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Owen 2

Eight critical resource and access issues:

- Impact to Bass Lake in Rusk County.
- New crossings of the Chippewa and Thornapple Rivers, which are on the NRI.
- Flambeau Mining Company property, with its system of trails.
- Flambeau River crossing, where the DNR has plans to extend the Flambeau River State Forest and there is a river access point.
- Rustic road crossing at Robin Avenue, adjacent to a wooden highway bridge.
- Access difficulties at numerous streams and wetlands.
- Crossing of the Nine Mile County Forest.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Owen 3

Nine critical resource and access issues:

- Impact to Bass Lake in Rusk County.
- Flambeau Mining Company property, with its system of trails.
- New crossings of the Chippewa and Thornapple Rivers, which are on the NRI.
- Flambeau River crossing, where the DNR has plans to extend the Flambeau River State Forest and there is a river access point.
- Three Lakes Wetland Mitigation Site. An existing transmission line crossing the site would be moved south of the site to be double circuited with the proposed line.
- Access difficulties at numerous streams and wetlands.
- Numerous new crossings of Fourmile Creek within a two-mile stretch. Fourmile Creek is an ERW and trout stream.
- Crossing of the Nine Mile County Forest.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Owen 4

Eight critical resource and access issues:

- Impact to Bass Lake in Rusk County.

- New crossings of the Chippewa and Thornapple Rivers, which are on the NRI.
- Flambeau Mining Company property, with its system of trails.
- Flambeau River crossing, where the DNR has plans to extend the Flambeau River State Forest and there is a river access point.
- Three Lakes Wetland Mitigation Site. An existing transmission line crossing the site would be moved south of the site to be double circuited with the proposed line.
- Access difficulties at numerous streams and wetlands.
- Crossing of the Nine Mile County Forest.
- Several crossings of municipally-owned properties, on which condemnation of an easement is not an option.

Comparison Between the Tripoli and Owen Sectors

Major differences exist between the proposed routes in the Tripoli and the Owen Sectors. Most of these differences are related to dissimilarities in land cover, route length, and opportunities for corridor sharing. Although the Owen Routes begin in an area that is largely forested around Exeland, as they proceed southeast they pass through a landscape that is mainly agricultural land. Except for portions of Marathon County, the Tripoli Routes pass through heavily forested areas between Exeland and the Weston Substation. The relatively undeveloped landscape in the Tripoli Sector contains more high quality natural resources than the agricultural landscape prevalent in the Owen Sector.

The Owen Routes are somewhat shorter (116 to 125 miles) than the Tripoli Routes (131 to 138 miles). Portions of the Tripoli Routes east and south of Prentice are largely devoid of corridor-sharing opportunities, whereas all of the Owen Routes follow existing corridor for at least 40 percent of their length. The Owen 1, Owen 3, Owen 4, Tripoli 3, and Tripoli 4 Routes follow an existing transmission line for 32 to 38 miles. The Owen 2, Tripoli 1, and Tripoli 2 Routes follow a transmission line corridor for only 8 to 15 miles.

The Owen Routes would require fewer miles of new corridor (through areas not containing transmission line, pipeline, railroad, or road); about 43 to 74 miles of new corridor would be needed for the Owen Routes, while 91 to 124 miles would be needed for the Tripoli Routes.

Because the Tripoli Routes cross twice as much forest as the Owen Routes (73 to 86 miles v. 34 to 44 miles), they would require over twice as much forest clearing. Many of the forests crossed by the Tripoli Routes consist of large, unbroken blocks, such as those found in state and county forests. Consequently, the potential for forest fragmentation is much more severe on the Tripoli Routes than the Owen Routes.

Similarly, the amount of wetland acreage affected and the number of rivers and streams encountered by the Tripoli Routes are higher than for the Owen Routes. The Tripoli Routes cross twice as many trout streams as the Owen Routes, but routes in both sectors could have severe impacts on certain stretches of high-quality streams. While routes in both sectors cross the Flambeau River, one Tripoli Route crosses the river within the boundaries of the Flambeau River State Forest.

Although much of the landscape in the Tripoli Sector is largely undeveloped and supports a number of high quality natural resources, three of the four routes in the Tripoli Sector would hav more homes within 150 feet of the proposed line than any of the routes in the Owen Sector.

The Owen Routes, although slightly shorter, cross much more farmland (57 to 64 miles) than the Tripoli Routes (27 to 42 miles). In both sectors, most of the routes lying on farmland are not adjacent to existing electric transmission lines. Depending on where the lines are located in relation to cultivated fields and farm buildings, interference with farming operations and concerns about induced currents would be serious issues.

Routes from both the Tripoli and Owen Sectors would cross the Nine Mile Forest as they approach the Weston Substation, although only the Tripoli 3 Route would require creation of a new ROW through the forest.

The Owen Routes pass through or near several areas where bird collisions could pose a significant hazard. These areas include the Pershing Wildlife Area, Three Lakes Wetland Mitigation Site, and prairie chicken booming grounds.

Construction of a Tripoli Route would involve many miles of additional 115-kV line construction and the erection of the 2.5-acre Tripoli Substation. If the 345 kV line is approved and an Owen Sector route is chosen, an alternative solution to meet the local load serving needs of the Rhinelander area (see Chapter 10) would have to be implemented.

Rhinelander Sector

The following is a summary and comparison of the impacts of the routes in the Rhinelander Sector. The Rhinelander Sector was divided into two parts: the section west of USH 51 and the section east of USH 51. There are three routes west of USH 51 and three routes east of USH 51. If the 115 kV Tripoli-Rhinelander transmission line is approved, one route must be selected from each section. An approach route and a transition route must also be chosen, but those choices will be somewhat constrained by the location of the proposed Tripoli Substation and the other route choices.

Table 12-4 compares the routes within the Rhinelander Sector. More dtailed information aout the potential impacts on each route can bge found in Chapter 11.

Table 12-4 Rhinelander Route comparisons table

	West of Hwy 51			East of Hwy 51		
	North	Central	South	Railroad	Hwy 8	Cross Country
General						
Total length (miles)	22.2	19	17.7	16.9	16.2	18.6
New ROW (acres)	157.5	110.5	133.5	82.5	70	88
Natural Resources						
Lakes nearby	1	7	1	3	3	5
River/stream crossings	9	8	7	6	5	6
River/stream crossings no infrastructure	2	0	4	0	0	1
Outstanding/Exceptional Resource Water crossings	1	3	4	1	1	0
Wetland (non-forested) crossed (mile)	0.6	1.2	2.1	1.3	0.7	0.7
Wetland affected (acres)*	17	23.5	27	19	14	18.5
Wetland forest cleared (acres)	13.0	17.5	11.0	6.0	7.0	11.0
Upland forest cleared (acres)	93.5	38.5	69.0	32.0	30.0	51.0
Forest blocks between 200-999 acres	2	0	3	1	1	4
Forest blocks greater than 1,000 acres	0	0	0	0	0	1
Social and Economic						
Homes within 300 feet	40	44	51	59	69	35
Closest home	2 @ 0-25	2 @ 0-25	2 @ 25-50	1 @ 25-50	1 @0-25	1 @ 2-25
Agricultural land crossed (miles)	1.2	1.7	1.3	1.6	1.6	1.4
Historical/archeological sites	1	1	0	0	0	2

* wetland includes forested and non-forested

Routes west of USH 51

The North Route is the longest of the three routes at 22.2 miles. It would also require the most new ROW. The South Route is the shortest of the three routes, but has the least amount of corridor sharing. The Central Route would share a ROW with USH 8 or the Wisconsin Central Railroad for 100 percent of its length.

Natural resources

The Central Route passes near the most lakes, but because of the extensive forest cover surrounding these lakes, the line would not likely be visible to residents on the lake or people recreating there. All of the routes cross about the same number of streams. However, the South Route has four crossings that occur in a setting where no existing infrastructure is present.

The North Route would require many more acres of upland forest clearing than the other two routes, 93.5 acres versus 69.0 acres on the South Route and 38.5 acres on the Central Route. Most of the clearing required for the South Route would be within the Lincoln County Forest. With respect to wetlands, the Central Route would affect 17.5 acres of forested wetlands, more than either of the other routes. Most of these wetlands are located adjacent to USH 8, and some clearing and construction impacts could be minimized if heavy equipment is limited to the roadbed. The greatest amount of total wetland (forested and non-forested) impact would occur

on the South Route. It has the most acreage affected and many of these wetlands are not easily accessible.

Socioeconomic impacts

The amount of agricultural land crossed and the number of homes within 300 feet of the proposed line are similar for all three routes. However, the South Route encounters the most residences because it passes through the north side of the city of Tomahawk. A transmission line located along USH 8 on the Central Route would be highly visible to tourists passing through and spending time in the Tomahawk area.

Routes east of USH 51

The Cross Country Route is slightly longer than the other two routes and would require slightly more new ROW. The Highway 8 Route is the shortest and because it has the most corridor sharing, it requires the least new ROW.

Natural resources

All three of the routes would have similar environmental impacts with respect to the number of stream crossings and wetland acres affected. The Cross Country Route would, however, have the greatest impacts with respect to the amount of upland and wetland forest clearing needed. It would result in 62.0 acres of forest clearing (upland plus wetland) in comparison to 37.0 acres on the Highway 8 Route and 38.0 acres on the Railroad Route. This is largely due to the need to develop a new 80-foot wide ROW through three miles of heavy forest cover east of CTH H, including two miles across the Treehaven property. A long expanse of non-forested wetlands adjacent to the Wisconsin Central Railroad corridor results in the Railroad Route affecting the most wetland acres.

Socioeconomic impacts

Because the Railroad Route and the Highway 8 Routes are located next to USH 8 and many town roads, they would have more residences within 300 feet of the proposed line. Again, placing the line along USH 8 between USH 51 and Spring Creek Road would make the line visible to many tourists visiting the Tomahawk and Rhinelander areas.